

LEAVENWORTH

National Fish Hatchery
Washington

Advance Project Planning for
Pollution Abatement Facilities



February 1985

ADVANCE PROJECT PLANNING
FOR
POLLUTION ABATEMENT FACILITIES
AT
LEAVENWORTH NATIONAL FISH HATCHERY
NEAR
LEAVENWORTH, WASHINGTON

Prepared For:

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
PORTLAND, OREGON

February, 1985

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SUMMARY

Under the authorization of the Federal Water Pollution Control Act, the Environmental Protection Agency established discharge guidelines and issued permits for fish rearing facilities. The Leavenworth National Fish Hatchery was issued a permit in 1975 which in effect required the construction of pollution abatement facilities. These facilities have performed satisfactorily to date, however, not all pollutant sources are connected to the pollution abatement lagoon and the lagoon shape and structures are not as effective as they could be in removing suspended solids. Additionally, a large volume of sand from Icicle Creek is being transported to the hatchery and deposited in the screen chambers, rearing ponds and pollution abatement lagoon.

To meet the requirements of the National Pollutant Discharge Elimination System permit and collect pollutants from all sources, the existing collection system will be expanded, two new pollution abatement lagoons will be constructed and a settling basin will be built on the Icicle Creek pipeline. The estimated 1986 construction cost for these modifications and related work is \$670,000, including an allowance for engineering, contingencies and assessments.

TABLE OF CONTENTS

	Summary	i
I	INTRODUCTION	1
II	PURPOSE AND NEED	4
III	SITE DATA	5
IV	ASSUMPTIONS AND DESIGN CRITERIA	6
V	COLLECTION SYSTEM	10
	A. Hatchery Diversion	10
	B. Large Rearing Pond Diversion	11
	C. Collection Piping	12
VI	LAGOONS	13
	A. Pollution Abatement Lagoon	13
	B. Water Control Structures	13
VII	SETTLING BASIN	16
VIII	PERMITS AND REGULATORY REQUIREMENTS	18
IX	DETAILED COST ESTIMATE	19
X	APPENDIX	22

FIGURES

I	LOCATION MAP	2
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PLATES

(Bound at the end of the report)

1	POLLUTION ABATEMENT FACILITIES
2	HATCHERY DIVERSION
3	DIVERSION DETAILS
4	LAGOON STRUCTURES
5	SETTLING BASIN

I INTRODUCTION

This report is submitted in partial fulfillment of Contract No. 14-16-0001-84078 between the Fish and Wildlife Service and Sverdrup & Parcel and Associates, Inc.

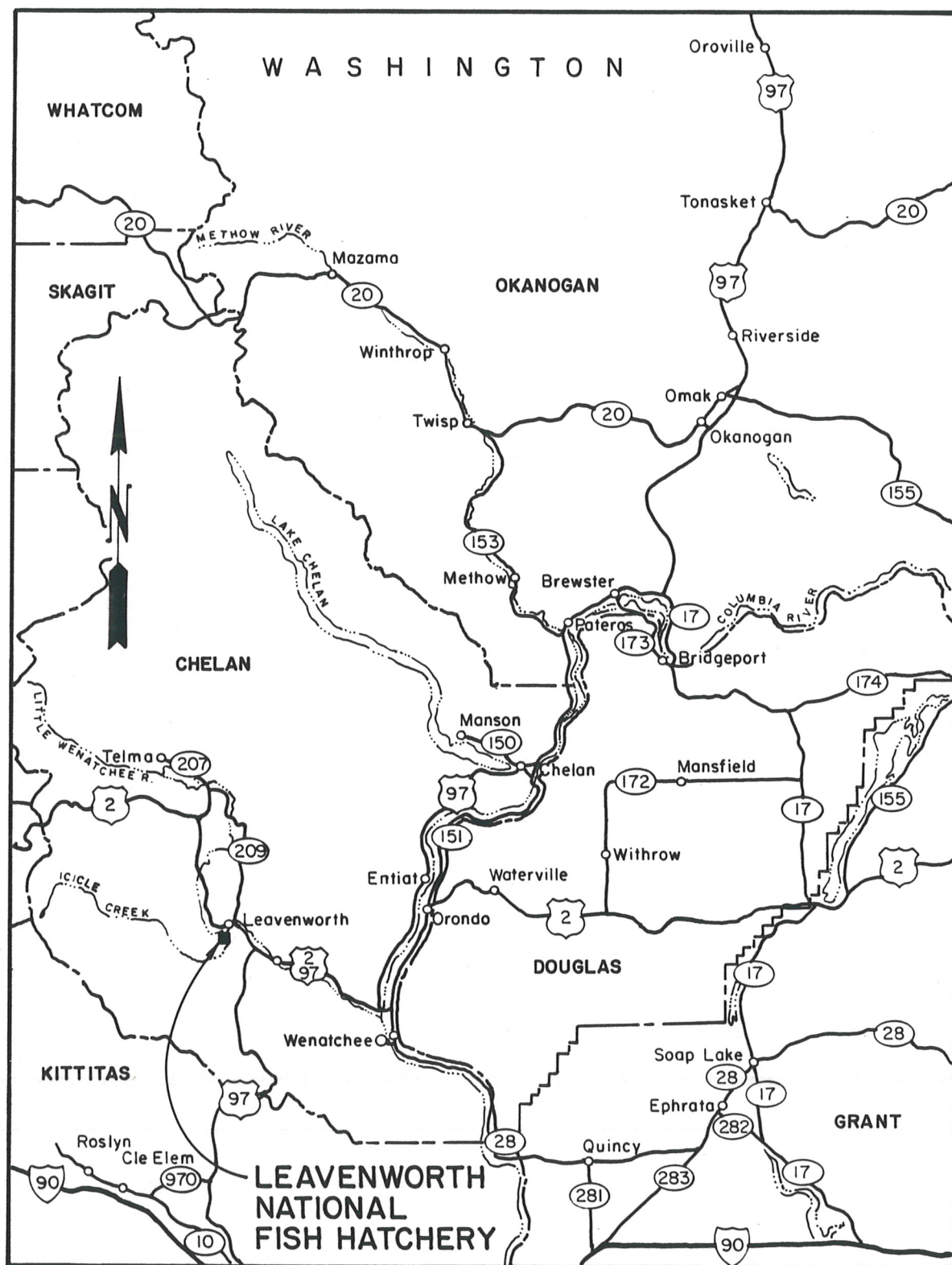
The report presents advance project planning for expansion and modification of the existing pollution abatement facilities and related work at the Leavenworth National Fish Hatchery.

The Leavenworth National Fish Hatchery was constructed in 1940 as part of mitigation measures to help relocate, enhance, and maintain spring chinook salmon stocks blocked by the construction of Grand Coulee Dam on the Columbia River. Construction of the facility was authorized by the Mitchell Act of 1938 (52 Stat.345).

The Leavenworth National Fish Hatchery is located on Icicle Creek, a tributary to the Wenatchee River, approximately 30 miles above its confluence with the Columbia River and near the town of Leavenworth, Washington, see Figure 1. By road the facility is adjacent to State Highway 2, approximately 40 miles northeast of Wenatchee. The hatchery site is located on fill within the Wenatchee River floodplain, and is immediately adjacent to Icicle Creek. Due to the hatchery's proximity to the Wenatchee River and Icicle Creek, flooding is an occasional concern during the spring runoff season.

Major features of the site include the hatchery building; adult holding ponds and fish ladder; 40 small rearing ponds (Foster-Lucas); 22 large rearing ponds (Foster-Lucas); 45 - 8 foot x 80 foot raceways; screen chambers and the 120 foot x 200 foot pollution abatement lagoon. Other features include pumphouses, storage and freezer buildings.

The Fish and Wildlife Service plans to rehabilitate and expand the pollution abatement facility at the Leavenworth National Fish Hatchery. This work is required to ensure compliance with the hatchery's EPA discharge permit when new permits are issued. The existing pollution abatement facility, constructed in 1979, is connected to the small rearing ponds, the 8x80 raceways, and the adult holding and spawning facility. The water control structures in the detention pond



LOCATION MAP



FIGURE I

do not provide an even distribution of flow through the pond and no provisions were made to remove solids from the pond.

II PURPOSE AND NEED

The station is currently meeting the requirements of its former discharge permit which expired in 1979. With additional water supply and reuse capacity now under construction, increased production at the station will result in effluent discharges exceeding the permit allowances, unless the treatment efficiency of the pollution abatement lagoon is improved and all facilities are connected to it. To accomplish this, it is proposed to incorporate all hatchery facilities into the pollution abatement drain system, reconstruct the existing lagoon, construct a second parallel lagoon, and a sand settling basin on the Icicle Creek pipeline.

The Advance Project Planning studies were made in sufficient detail to establish the practical feasibility of the proposed project and to prepare a preliminary estimate of construction costs. Section III of this report contains site and facility data. Section IV presents the assumptions and design criteria used. The collection system, lagoons and settling basins are described in Sections V through VII. Permits and regulatory requirements are discussed in Section VIII. Detailed preliminary construction cost estimates are contained in Section IX. Plates at the back of the report show general site features and schematic plans of the proposed structures.

III SITE DATA

The majority of the water supply for the hatchery operations is supplied via a 2 mile long pipeline from a gravity intake located on Icicle Creek. This water is routed through one of two screen chambers prior to use, with excess flow being returned to the creek via an unlined canal. Supplemental water for temperature and disease control is obtained from several wells on the hatchery grounds. An extensive reuse system is also in place to allow water to be used twice in the large rearing ponds and up to three times in the small rearing ponds. Multiple use in the 8x80 raceways is also possible by gravity flow.

The existing pollution abatement facilities are a 17 foot deep, 120 foot by 200 foot lagoon with an overflow weir outlet structure and an upwell inlet structure; and 36-inch and smaller piping which connects the 8x80 raceways, small rearing ponds and adult holding facilities to the lagoon. The 8x80 raceways were constructed at the same time as the pollution abatement facility and are state-of-the-art facilities. They are connected to the pollution abatement drain system through 8-inch diameter standpipes located in the floor of each raceway. By removing the standpipes, water and waste from the raceways is discharged into the pollution abatement system. The small rearing ponds have a diversion point incorporated into the manhole located at the end of each group of ponds. By opening a canal gate located in the manhole, the water and waste entering the manhole from the rearing ponds is diverted to the lagoon for treatment. The adult holding ponds can also be used as rearing ponds and have a standpipe drain system similar to the 8x80 raceways incorporated into their design. Drains from the adult holding pond headbox and spawning building are connected to the pollution abatement lagoon as well. The hatchery building and large rearing ponds were not incorporated into the original wastewater collection system.

IV ASSUMPTIONS AND DESIGN CRITERIA

One function of the Environmental Protection Agency is to issue permits or authorizations for fish rearing facilities to discharge into state receiving waters. Under the National Pollutant Discharge Elimination System (NPDES), these permits will be issued in accordance with the effluent limitations, monitoring requirements and other conditions that are established in compliance with the provisions of the Federal Water Pollution Control Act (Clean Water Act).

In January, 1975, a NPDES permit was issued to the Fish and Wildlife Service for the Leavenworth National Fish Hatchery. This permit, which is based on proposed effluent limits set by the EPA in its 1974 "Draft Development Document for Effluent Limitation Guidelines for Fish Hatcheries and Farms", set the following discharge limitations for the period from July 1, 1977 through expiration:

<u>Effluent Characteristic</u>	<u>Total Discharge</u>	<u>Cleaning Effluent</u>
Suspended Solids		
Daily Average	1,551 lbs./day	
Daily Maximum	2,045 lbs./day	
Instantaneous Maximum	15 mg/l*	15 mg/l*
Settleable Solids		
Daily Average	0.1 ml/l	-
Instantaneous Maximum	-	0.2 ml/l
*Net allowable over intake		

This permit expired in August, 1979 and no replacement or extension has been authorized. The self-monitoring program, established in 1975 as part of the original permit, remains in effect.

The State of Washington, Department of Ecology was authorized by the EPA in 1977 to issue permits under the NPDES for all dischargers except Federal and Indian sources. The State has applied for authority to permit these sources as well. State discharge standards are based on the 1974 guidelines, and when the State receives authorization to issue permits for federal hatcheries, the permits are expected to be similar to these guidelines. A copy of current State permit requirements is contained in the Appendix along with the former NPDES permit and summary

reports from the self-monitoring program. These reports demonstrate that the existing facility is generally producing an acceptable effluent using the current cleaning procedure.

State discharge permits contain a requirement for 85 percent removal of the suspended solids contained in the cleaning effluent. This requirement has not been contained in discharge permits issued previously for the hatchery. Studies by the EPA have determined that the following design criteria for waste treatment lagoons will produce an effluent which meets the current discharge standards, including 85 percent removal of suspended solids:

- one hour detention time
- hydraulic loading of less than 1,000 gallons per day per
square foot of surface area
- length-to-width ratio of greater than 3

Current cleaning procedures are designed to remove settleable solids from the trough or pond floor. Suspended solids typically remain in suspension during their entire pass through the facility and are discharged directly to the river. The settleable solids are primarily composed of fecal material, waste food particles, and sand which accumulate on the floor of the trough or pond. Cleaning operations are fairly uniform for all facilities, although the size and type of tools and manpower requirements vary considerably. In general, cleaning operations are initiated by removing a standpipe or opening a valve to lower the water level in the pond or trough. When the water level reaches approximately half of the original depth, the water velocity along the floor is great enough that the solids can be loosened by brushing and will be carried the length of the pond and down the drain by the water. The pond or trough is brushed and scraped, if necessary, beginning at the water supply end and continuing to the drain end. The hatchery personnel monitor the water level during this procedure to insure that adequate water depths remain at all times. Following cleaning, the standpipe or valve is replaced and the pond allowed to refill. By connecting the drain to the detention pond, the solids and

accompanying water can be separated from the normal drain path and treated.

Several planning assumptions have significantly influenced development of the proposed facility rehabilitation and expansion. The most important assumptions are as follows:

- o Pollution abatement facilities constructed to meet the 1974 draft effluent limitations will be adequate for the final standards.
- o New facilities will be physically and functionally similar to existing facilities to provide consistent maintenance and operation.
- o New facilities will not require significant modification to current procedures or schedules for pond cleaning.
- o Advance technology, mechanical or chemical treatment, will not be utilized.

Based on discussions with hatchery operating personnel, the following hydraulic criteria were developed for the pollution abatement system:

<u>Facility</u>	<u>Inflow</u>	<u>Drawdown Time</u>	<u>Number</u>
Incubation (Concrete) Trough	15 gpm	8 min.	18
Fry (Fiberglass) Trough	35 gpm	5 min.	9
Small Rearing Pond (Foster-Lucas)	220 gpm	40 min.	6 (2 per bank)
Large Rearing Pond (Foster-Lucas)	600 gpm	70 min.	3
8x80 Raceway	300 gpm	5 min.	2

Inflow is the quantity of water supplied to each trough or pond, drawdown time is the time required to lower the water level from the normal operating depth to the cleaning depth, and number is the number of troughs or ponds which can be simultaneously lowered given the stated inflow and time. These criteria are interactive, and at greater or lesser inflows and drawdown times, different numbers of ponds can be lowered simultaneously.

The small rearing ponds and 8x80 raceways are connected to the existing pollution abatement drain system which will be unaffected by the expansion of the system. The criteria shown are estimates of the current operating conditions based on observations by hatchery personnel.

V COLLECTION SYSTEM

The collection system consists of diversion structures for intercepting cleaning flows from the large rearing ponds and the hatchery building drain trenches and the piping necessary to convey the flow to the lagoon for detention. Plate 1 shows the diversion point locations and new piping system, and Plates 2 and 3 show details of the individual diversions.

A. HATCHERY DIVERSION

The hatchery building is arranged in four rows of incubation and fry troughs. Each row of troughs is divided in half by an aisle which bisects the building and further subdivided by the two main drain trenches which run transversely across the building at approximately the quarter points. This arrangement results in 16 groups of nine troughs of varying types, eight groups in each half of the building draining into two main drain trenches which connect to the main hatchery drain. The secondary drain trenches, each of which drain nine troughs, are 12 inches wide and vary from 9 to 12 inches deep. The main drain trenches are 18 inches wide and vary from 24 to 32 inches deep as they cross the building. At the end of the main trench, the water drops through a grating into a 24 inch diameter sump and from there flows to the main hatchery drain system through a 15 inch pipe.

One diversion point to the pollution abatement lagoon will be located at the junction of each secondary trench with the main drain trench. This will allow flow from as little as one sixteenth of the hatchery to be diverted to pollution abatement lagoon, leaving the majority of the flow from the troughs available for re-use during periods of insufficient water quantity or quality. A diversion point will also be provided from the sump at the end of the main drain trench. This diversion will be used when water is plentiful for hatchery operations and will divert all the flow from one half of the hatchery to the lagoon.

The capacity of the diversion will be 3,700 gpm from each half of the hatchery. This is equivalent to cleaning two groups of nine troughs in each half or cleaning one group of nine troughs plus the inflow from the remaining 7 groups of troughs in each half of the

building. Because the diversion points are located in the drain trenches, the time required to draw down the water level in the troughs will be unaffected by construction of the diversion to the lagoon.

The diversions at the end of the secondary trenches will be accomplished through the use of movable standpipes. The area at the end of the secondary drain trench, adjacent to the main hatchery drain trench, will be rebuilt to include a sump with a 10 inch diameter drain opening in the bottom. During normal operations, a standpipe in the drain opening will cause the water to fill the sump and overflow into the main drain trench. To divert the cleaning waste to the lagoon, the standpipe will be removed, causing the sump to empty and any entering flow to be drained through the collection system. The standpipes will be fabricated from aluminum, for light weight, and the sumps will be covered with removable grating to protect the hatchery personnel. The diversion at the end of the main drain trench will be activated by opening a valve connecting the existing sump with the effluent collection system.

B. LARGE REARING POND DIVERSION

The design of the Foster-Lucas pond, which drains to the middle of an oval shaped rearing pond, makes interception of cleaning wastes from the individual ponds impractical. The diversion will be similar to that currently in use at the small rearing ponds where the entire flow from one bank of ponds is diverted to the pollution abatement lagoon by a gated drain in the manhole at the end of the ponds. A new manhole will be installed in the existing drain line which connects the ponds with the main hatchery drain to Icicle Creek. The new manhole will extend approximately two feet below the existing flow line to create a sump for collection of pond cleaning flows. The sump will be connected to the lagoon by a drain line with a canal gate. To divert cleaning waste to the lagoon, the canal gate will be opened, draining the sump and any flow entering the manhole from the group of ponds. This operation will be the same as the current procedure for diverting flow from the small rearing ponds, providing a common operating procedure for cleaning both the large and small rearing ponds.

The time required to drain the large rearing ponds is controlled by the 8-inch diameter connection from the floor of the pond

to the existing drain system. This time is estimated to be 70 minutes, however, the first foot of water will drain in about 12 minutes, with the final foot requiring over 24 minutes. Because the diversion is located in an existing manhole, it will have no effect on the current drain times. The diversion and collection system is designed to handle up to 3 large ponds draining simultaneously, plus the normal inflow to the remaining ponds in one bank of large ponds.

C. COLLECTION PIPING

Pipe to connect the individual diversions with the lagoon will be reinforced concrete pipe (RCP) with watertight gaskets. This pipe is readily available, easy to install and economical. Piping in the hatchery building will be PVC sewer pipe due to its ease of installation and the wide variety of fittings available. Connection of the new diversion points to the existing pollution abatement piping system is not possible due to the location and elevation of the existing drain lines between the 8x80 raceways and the small rearing ponds. The selected route from the hatchery and large rearing ponds to the new lagoons is between the hatchery building and small rearing ponds. This area is congested, however, most of the existing facilities are water supply piping or power lines which are generally located at a higher elevation than the new pollution abatement drain will be. This routing provides a more direct path to the lagoon from the ponds, and will not impact the capacity of the existing drain system.

VI LAGOONS

The pollution abatement lagoon consists of two rectangular earth ponds, concrete inlet and outlet structures, and a flow distribution box. Details of the structures are shown on Plate 4.

A. POLLUTION ABATEMENT LAGOON

The existing pollution abatement lagoon is rectangular in plan, with a base area of 50 feet by 125 feet and a normal operating depth of 8 feet. The pond is unlined and has side slopes of 2 horizontal to 1 vertical. Based on the volume of water detained and surface area, the nominal capacity of the existing lagoon is 9,000 gpm. Two lagoons are required to provide adequate capacity for multiple rearing pond or raceway cleaning during peak hatchery loading periods, and allow for annual cleaning of one lagoon by draining it during periods of reduced hatchery load.

The sands and gravels which form the lagoon sides are relatively permeable, however, with time, the materials flushed from the rearing ponds have sealed the bottom and sides of the existing lagoon and it appears to be relatively impermeable. Similar results at the new lagoon are anticipated. To allow for seasonal removal of accumulated material, access ramps will be provided for each lagoon.

B. WATER CONTROL STRUCTURES

The existing structures consist of an upwell type inlet structure fabricated from a section of 48-inch concrete pipe on a concrete slab, and a collection box with a V-notch weir for an outlet structure. These structures have usually produced an acceptable effluent to date, primarily due to the limited volume of cleaning waste that must be treated. The structures make no provision for distributing the flow evenly across the width of the lagoon and, from inspection of the silt deposition pattern in the lagoon, it is apparent that the majority of the flow is moving directly from the inlet to the outlet without uniform flow distribution across the lagoon.

A more effective structure would be one which distributes the flow evenly across the width of the lagoon. Structures which accomplish this have been used at several recently constructed facilities and are proposed for both lagoons. The proposed inlet structure is a

rectangular concrete box with one side open to the lagoon. The open side has stoplog guides and spaced stoplogs to distribute the flow evenly across the width and height of the structure. Wingwalls at each end retain the fill behind the structure. The outlet structure is similar in shape and construction, however, rather than spaced stoplogs, it has an overflow weir the full width of the structure. A canal gate at the bottom of the structure will allow for draining the lagoon to remove the accumulated solids. Because these structures should extend across the entire width of the lagoon in order to maximize the settling efficiency of the lagoon, the existing lagoon will be reshaped into a relatively longer and narrower rectangle. A base area of 35 feet wide by 200 feet long, with 2 horizontal to 1 vertical side slopes is proposed. This shape will reduce the size and cost of the inlet and outlet structures without compromising the settling efficiency of the lagoon. At a normal operating depth of 6 feet, the design capacity of each lagoon will be 9,000 gpm. Adequate property is available for construction of the new lagoon and reshaping of the existing one.

A new outfall structure will be required to return treated effluent to the creek. The existing structure is located too high to permit the existing lagoon to completely drain. The structure will be a standard culvert outlet type structure with wingwalls and sufficient riprap to protect it from erosion. The outlet will be located as high on the bank as practicable, and a grating will be provided to prevent returning fish from entering the lagoons.

When pollution abatement facilities were initially constructed, a distribution box was constructed on the embankment at the head of the lagoon. The box has a 24-inch pipe stub, which is presently covered, and provisions for the installation of canal gates to direct the flow to either of two lagoons. A similar distribution box will be constructed at the head of the new lagoon, and canal gates will be installed on the two drains leading to the lagoons. A 24-inch pipe will connect the two boxes and provide equal distribution of flow between the two lagoons during normal operations. To clean one of the lagoons, the canal gate in the distribution box will be closed to prevent water from entering the lagoon to be cleaned. The canal gate at the outlet structure will be opened to drain the lagoon and the sediment allowed to

dry. A small loader can then be used to remove the material from the lagoon. By removing the stoplogs from the inlet structure, the material which has accumulated can be removed from behind the stoplogs.

VII SETTLING BASIN

The settling basin consists of a rectangular concrete box with a built in access ramp and flow distribution and collection structures. Details of the structure as shown on Plate 5.

During periods of high water, a considerable volume of sand and debris from Icicle Creek is collected at the intake and transported through the pipeline. This material settles at any location where the water velocity drops, primarily the screen chambers and 8x80 raceways. The material which deposits in the screen chambers must be removed by hand using shovels and buckets, or it can be flushed into the pollution abatement system with a fire hose. Some of the fine sand remains in suspension, passing through the screen chamber, and is deposited in the 8x80 raceways. This sand is then flushed to the pollution abatement lagoon during routine cleaning operations. It is estimated that 75% of the material deposited in the existing lagoon is sand from Icicle Creek. This is evidenced by the large mound which has formed around the inlet to the lagoon; the material being almost totally fine sand. Removal of the sand from the lagoon can be easily accomplished with a front end loader, and with construction of the new lagoon structures, the deposition pattern should be more uniform, actually creating better settling conditions. The concern is that much of this material has already been handled once either by hosing from the screen chamber or cleaned from the rearing ponds, and that this second handling to remove the sand from the lagoon is an unnecessary duplication of effort.

The estimated 50 cubic yards of sand which annually washes down the Icicle Creek pipeline imposes a considerable operation and maintenance burden on the hatchery personnel, which could be easily eliminated. Additionally, the material which deposits in the screen chamber contributes to the number of low water level alarms which occur each year.

The settling basin will function much like the pollution abatement lagoons, except that it will be constructed of concrete to maintain water quality. The supply end will have spaced stoplogs to provide an even horizontal and vertical distribution of flow to the basin. The outlet end of the basin will be ramped to provide access for

removing the accumulated sand on an annual basis. The ramp will have a collection channel built into it which will function like an overflow weir. Removable grating will be installed over the collection channel to provide access for cleaning the basin. During normal operating conditions, the grating will be removed to prevent debris from clogging the openings. Piping will connect the Icicle Creek pipeline to the settling basin at each end. The existing pipeline will serve as a bypass to permit cleaning of the basin. A floating debris skimmer will collect any floating debris entering the basin. The drain from the basin will be connected to the pollution abatement facility so that sand will not be returned to Icicle Creek during cleaning of the basin.

During winter months, the basin will be drained and the existing pipeline used to supply water to the screen chambers without settling. Sand loads will be low during these months and the basin would be subject to freezing if it is not drained.

The settling basin has been designed to provide a 25 minute detention time for a flow of 13,500 gpm. This detention time is slightly more than the estimated time of 20 minutes which is currently provided in the 8x80 raceways and should eliminate the accumulation of sand in the raceways. The design flow is the normal operating condition of the Icicle Creek Pipeline.

VIII PERMITS AND REGULATORY REQUIREMENTS

Construction of the pollution abatement facilities will require federal, state and local permits. The outfall is located below ordinary high water, requiring a Department of the Army, Corps of Engineers, Section 10 Permit for construction affecting navigable waters. A State of Washington, Department of Fisheries and Department of Game, Hydraulic Project Permit will also be required for the outfall. The outfall, lagoons and portions of the piping system are within 200 feet of ordinary high water and will require a Chelan County Shoreline Substantial Development Permit. An environmental check list as defined in the State of Washington, Environmental Protection Act, will have to be submitted to Chelan County along with the substantial development permit application. A cultural resource survey may be required at the lagoon site, although this area has been previously disturbed by construction of the existing lagoon and by farming operations. No property acquisition is required, therefore, an environmental assessment is not required.

IX DETAILED COST ESTIMATE

The following construction cost estimate has been prepared using recent bid data and published construction cost information, adjusted to approximate contracted construction costs as of October, 1984.

When these prices were prepared, the Engineering News Record (ENR) Construction Cost Index was 4160. Adjustments to these costs at a future date may be made by multiplying the ratio of the current index to 4160 by the estimated construction cost.

For this study, a 7% per year rate of escalation for labor and materials was used to inflate the estimate to the anticipated construction year. Appropriate percentages for Engineering, Contingencies and Assessments were also added.

LEAVENWORTH NATIONAL FISH HATCHERY
 POLLUTION ABATEMENT FACILITIES
 CONSTRUCTION COST BREAKDOWN
 (October, 1984)

ITEM	QUANTITY	UNIT COST	TOTAL COST
LAGOONS			
Excavation	12,000 CY	\$ 5.00	\$ 60,000.00
Concrete	110 CY	300.00	33,000.00
Walkway Grating	40 SF	10.00	400.00
Miscellaneous Metal	4,800 LB	3.00	14,400.00
18" Canal Gate	2 EA	1,000.00	2,000.00
Treated Lumber	1,200 BF	1.50	1,800.00
Riprap	100 TN	30.00	3,000.00
			<u>3,000.00</u>
			\$114,600.00
HATCHERY DIVERSION			
Cut Concrete Floor	240 LF	\$ 10.00	\$ 2,400.00
Hand Excavation	110 CY	50.00	5,500.00
12" PVC Pipe	180 LF	15.00	2,700.00
15" PVC Pipe	70 LF	20.00	1,400.00
Diversion Boxes	16 EA	1,000.00	16,000.00
Miscellaneous Metal	1,000 LB	3.00	3,000.00
Patch Floor	500 SF	5.00	2,500.00
15" Knife Valve	2 EA	2,000.00	4,000.00
Fittings	LS	10,000.00	10,000.00
			<u>10,000.00</u>
			\$ 47,500.00
LARGE POND DIVERSIONS			
Shoring	1,000 SF	\$ 5.00	\$ 5,000.00
Excavation	40 CY	20.00	800.00
54" Manhole	3 EA	2,000.00	6,000.00
24" Canal Gate	3 EA	1,300.00	3,900.00
Surface Restoration	50 SY	10.00	500.00
			<u>500.00</u>
			\$ 16,200.00
COLLECTION SYSTEM			
Trench Excavation	1,800 CY	\$ 5.00	\$ 9,000.00
15" RCP	250 LF	25.00	6,250.00
18" RCP	240 LF	25.00	6,000.00
24" RCP	1,050 LF	35.00	36,750.00
54" Manhole	3 EA	1,500.00	4,500.00
Backfill and Compact	1,800 CY	2.00	3,600.00
Surface Restoration	500 SY	10.00	5,000.00
24" Canal Gate	2 EA	1,300.00	2,600.00
			<u>2,600.00</u>
			\$ 73,700.00

ITEM	QUANTITY	UNIT COST	TOTAL COST
SETTLING BASIN			
Excavation	4,100 CY	\$ 5.00	\$ 20,500.00
Concrete	520 CY	200.00	104,000.00
18" Steel Pipe	15 LF	100.00	1,500.00
18" RCP	410 LF	25.00	10,250.00
30" Steel Pipe	40 LF	200.00	8,000.00
30" Butterfly Valve	3 EA	7,000.00	21,000.00
48" Manhole	1 EA	1,500.00	1,500.00
Bar Grating	70 SF	30.00	2,100.00
Miscellaneous Metal	6,000 LBS	3.00	18,000.00
Trench Excavation	450 CY	5.00	2,250.00
Backfill & Compact	450 CY	2.00	900.00
Treated Timber	600 BF	1.50	900.00
Debris Skimmer	1 EA	5,000.00	5,000.00
			<u>\$195,900.00</u>
	Subtotal		\$447,900.00
Inflation to October, 1986			
	\$447,900 x 14%		<u>62,700.00</u>
	1986 Subtotal		\$510,600.00
Contingencies			
	\$510,600 x 10%		51,100.00
Engineering			
	\$510,600 x 15%		76,600.00
Assessments			
	\$510,600 x 5%		<u>25,500.00</u>
			\$663,800.00
TOTAL ESTIMATED COST			\$670,000.00

IX APPENDIX

1. Current State of Washington permit requirements
2. NPDES permit
3. Summary of monitoring reports

Permit No. _____

Issuance Date _____

Expiration Date _____

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT

State of Washington

DEPARTMENT OF ECOLOGY
Olympia, Washington 98504

In compliance with the provisions of
Chapter 90.48 RCW as amended

and

The Federal Water Pollution Control Act Amendments of 1972,

Public Law 92-500

Washington State Department of Fisheries
General Administration Building
Olympia, Washington 98504

Hatchery Name:

Receiving Water:

Location:

Discharge Locations:

Hatchery Type:

Waterway Segment No.:

is authorized to discharge in accordance with the special
and general conditions which follow.

R. Jerry Bollen, Assistant Director
Department of Ecology

SPECIAL CONDITIONS

S1. INTERIM EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the date of issuance of this permit and lasting through June 30, 1977, the permittee is authorized to discharge subject to the following limitations and monitoring requirements:

<u>Parameter</u>	<u>EFFLUENT LIMITATIONS</u>		<u>MONITORING REQUIREMENTS</u>	
	<u>Daily Average</u>	<u>Daily Maximum</u>	<u>Minimum Frequency</u>	<u>Sample Type</u>
<u>Total Discharge</u>				
Flow	"a" mgd	----	weekly	daily total
Settleable Solids	----	----	weekly	grab
<u>Cleaning Effluent</u>				
Settleable Solids	----	----	weekly	grab

Sampling for the cleaning effluent shall be done during the cleaning operation. If the cleaning is performed less often than weekly, the frequency for sampling shall be at that lessor frequency.

In addition, the pounds of fish on hand and pounds of food fed shall be reported for each month.

(Notes to permit writer:)

(Conditions S1 and S2 apply only to raceways and tanks which are cleaned at regular intervals. Release ponds, that is ponds (usually unlined) that are generally drained once or twice a year at time of fish release are to be covered by special condition S4 "RELEASE PONDS".

"a." The permit writer should enter the highest monthly average flow.

"b." The permit writer should enter here the lbs/day which results from multiplying the factor (2.2 lbs/100 lbs fish) times the lbs of fish on hand during the maximum month.

"c." The factor to use for "daily maximum" is 2.9 lbs/100 lbs fish.)

Revised 5/13/75

S2. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

After June 30, 1977, and lasting until the expiration date of this permit, the permittee is authorized to discharge subject to the limitations as specified below:

Beginning on this date no organic solids settled out in fish culturing facilities shall be resuspended and discharged with the tailwaters nor otherwise discharged to surface waters as a result of discretionary management practices without first undergoing treatment by sedimentation or its equivalent.

A. CLEANING WASTEWATER TREATMENT FACILITY

The design and operation of the treatment process shall provide for 85 percent removal of the suspended solids contained in the cleaning wastewater. Monitoring of the influent and effluent by the permittee will be required to determine compliance.

B. EFFLUENT LIMITATIONS

<u>Parameter</u>	<u>Daily Average</u>	<u>Daily Maximum</u>	<u>Sample Type</u>
Flow	"a" mgd	----	daily total
Settleable Solids	0.1 ml/l	0.2 ml/l	grab
Suspended Solids	"b" lbs/day (See note previous page)	"c" lbs/day	composite
Suspended Solids	----	15 mg/l	grab

The daily average is defined as the average of the measured values obtained over a calendar month's time.

The daily maximum is defined as the greatest allowable value obtained during any calendar day.

Effluent limitations are net values allowable above that of the intake water.

A composite sample is comprised of four or more sub-samples characteristic of the effluent during a daytime workshift. When sampling two or more outfalls, each grab sample is sized in proportion to the flow being sampled before combining with the other samples.

A monitoring schedule for the period after June 30, 1977 will be established by the Department, prior to that date, for sampling suspended solids, settleable solids, and flow. This schedule will include, as a minimum, all aspects of the interim testing schedule, and in addition will include such additional testing as determined by the Department. The schedule will include monitoring of the performance of the treatment process.

S3. SCHEDULE OF COMPLIANCE

- a. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:
 1. Submit a preliminary plan for review by December 31, 1975 describing the proposed waste treatment program. This plan shall include specific methods, and sizing of units, to be used in removing and treating wastes resulting from cleaning operations.
 2. Submit final engineering plans for review by June 30, 1976.
 3. Report of construction progress on March 30, 1977.
 4. Attain compliance with final limitations by June 30, 1977.
- b. The permittee shall provide the appropriate regional office of the Department with written notice of compliance or non compliance with the interim or final requirements not later than 14 days after each date set forth above.

S4. MONITORING AND REPORTING

The permittee shall monitor the operation of all treatment and control facilities and the quantity and quality of the waste discharged. A record of all such data shall be maintained. The permittee shall monitor the parameters as specified in Conditions S1 and S2 of this permit.

a. Reporting

Monitoring results obtained during the previous month shall be reported on the Department of Ecology reporting form and submitted no later than the 15th day of the month following the completed reporting period. Monitoring shall be started _____ and the first report is due _____.

The report shall be sent to the _____ Office of the Department of Ecology, _____.

If the permittee monitors any pollutant more frequently than required by the permit, he shall submit the results together with the monthly report.

b. Sampling Procedures

The permittee shall submit to the aforementioned regional office a summary of the sampling and analysis program it will use when transmitting the first monitoring report. The summary is to a detailed description of the sampling procedures, sample analysis techniques, and exact location of sampling stations shown by sketch.

(Conditions to be used when applicable)

S4. RELEASE PONDS* - EFFLUENT LIMITATIONS

When a release pond is drained the flow shall be controlled such that the settleable solids in the discharge does not exceed 3.3 ml/liter at any time.

The permittee shall monitor the discharge during draining operations by taking daily grab samples which are representative of the discharge that day. The samples shall be analysed for settleable solids and the results reported in the regular monthly report.

(The following two paragraphs are to be used in those few cases where the ratio of hatchery discharge to streamflow creates such a problem that additional investigation is warranted:)

S5. WATER QUALITY STUDY

The permittee shall conduct a water quality study of the receiving stream during low flow conditions in the summer of 1975. Study shall be sufficient to ascertain whether, by installation of facilities to meet the July 1, 1977 effluent limitations, the state water quality standards will be met.

Results of the study shall be submitted to the _____ Regional Office of the Department of Ecology by November 1, 1975. If the study indicates additional improvements are necessary to meet the water quality standards, these improvements shall be installed according to the schedule of paragraph S3.

*Ponds (usually unlined) that are generally drained once or twice a year at time of fish release.

c. Records Retention

The permittee shall retain for a minimum of three years all records of monitoring activities and results, including all reports of recordings from continuous monitoring instrumentation. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the permittee or when requested by the Director.

d. Recording of Results

The permittee shall record each measurement or sample taken pursuant to the requirements of this permit for the following information: (1) the date, exact place, and time of sampling; (2) the dates the analyses were performed; (3) who performed the analyses; (4) the analytical techniques or methods used; and (5) the results of all analyses.

e. Representative Sampling

Samples and measurements taken to meet the requirements of this condition shall be representative of the volume and nature of the monitored discharge.

f. Test Procedures

All sampling and analytical methods used to meet the monitoring requirements specified in this permit shall, unless approved otherwise in writing by the Department, conform to:

American Public Health Association, Standard Methods for the Examination of Water and Wastewaters, latest edition, or Guidelines Establishing Test Procedures for the Analysis of Pollutants, contained in 40 CFR part 136, as published in the Federal Register.

S5. OTHER REQUIREMENTS

- a. Waterborne silt, sand, and other debris deposited on the premises shall not be deposited back into a watercourse.
- b. Permittee shall handle and dispose of all solid waste materials in such a manner as to prevent their entry into State ground or surface water.
- c. Fish mortalities and spawned fish shall not be disposed to a watercourse.

(Note to permit writer: Where the layout of the hatchery is such that it is feasible to divert the blood and spawning wastes from the hatchery discharge, the following condition should be added:)

- d. ~~After June 30, 1977 blood and wastes resulting from spawning operations shall not be allowed to enter a watercourse but shall be disposed on land or by other means. Implementation shall be according to the compliance schedule of condition S3.~~

Permit No.: WA-000190-2

Application No.: WA-000190-2

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. § 1251 et seq; the "Act"),

Department of Interior
U.S. Fish and Wildlife Service
Leavenworth National Fish Hatchery

is authorized to discharge from a facility located at Chelan County, near Leavenworth, Washington

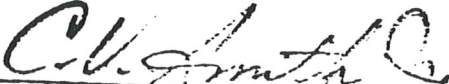
to receiving waters named the Columbia River ^{Leitch Creek} via ~~Wenatchee River~~

In accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on January 30, 1975.

This permit and the authorization to discharge shall expire at midnight August 31, 1979.

Signed this 30th day of December, 1974


Regional Administrator

PART I

Permit No.: WA-000190-2

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Initial Effluent Limitations

a. During the period beginning on the effective date of this permit and lasting through June 30, 1977, the permittee is authorized to discharge in accordance with certain limitations. Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS	Sample Type
	Daily Average	Daily Maximum	Instantaneous Maximum	Measurement Frequency	
<u>Total Discharge</u>					
Flow m ³ /day (MGD)	N/A	N/A	N/A	Daily	Total
Suspended Solids kg/day (lbs/day)	831 (1832)	1087 (2396)	N/A	1/Month	Composite
<u>Cleaning Effluent</u>					
Settleable Solids ml/l	N/A	N/A	2.2	1/Week	Grab
<u>Non-Cleaning Effluent</u>					
Settleable Solids ml/l	N/A	N/A	0.2	2/Month	Grab

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: at the discharge prior to mixing with the receiving water. Grab samples for instantaneous maximums shall be taken from a single raceway.

The total discharge shall be sampled for suspended solids during representative periods of raceway cleaning in the effluent prior to discharge to the receiving water. Samples shall be collected at the minimum frequency specified above regardless of the frequency of cleaning operations.

2. Final Effluent Limitations

a. During the period beginning on July 1, 1977 and lasting through the expiration date of this permit, the permittee is authorized to discharge in accordance with certain limitations. Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTIC</u>	<u>DISCHARGE LIMITATIONS</u>			<u>MONITORING REQUIREMENTS</u>	
	<u>Daily Average</u>	<u>Daily Maximum</u>	<u>Instantaneous Maximum</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
<u>Total Discharge</u>					
Flow m ³ /day (MGD)	N/A	N/A	N/A	Daily	Total
Suspended Solids					
kg/day	704	921	N/A	1/Month	Composite
(lbs/day)	(1551)	(2045)			
mg/l	N/A	N/A	15*	1/Month	Grab
Settleable Solids ml/l	0.1	N/A	N/A	2/Month	Grab
<u>Cleaning Effluent</u>					
Suspended Solids mg/l	N/A	N/A	15*	2/Month	Grab
Settleable Solids ml/l	N/A	N/A	0.2	1/Week	Grab

*Net allowable over intake.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharges prior to mixing with the receiving water. During periods of cleaning, the cleaning effluent shall be sampled before such effluent is combined with any other flow.

The total discharge shall be sampled for suspended solids during representative periods of raceway cleaning in the effluent prior to discharge to the receiving water. Samples shall be collected at the minimum frequency specified above regardless of the frequency of cleaning operations.

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

- a. Report of preliminary plan by March 31, 1975.
- b. Submit preliminary plan by April 30, 1975.

- c. Report of progress July 31, 1975 and quarterly thereafter.
- d. Submit final plan by December 31, 1975.
- e. Attain compliance with final limitations by July 1, 1977.

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

C. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting

Monitoring results shall be summarized each month on a Discharge Monitoring Report form (EPA 3320-1) and submitted quarterly. The three monthly summaries shall be submitted, postmarked no later than the 28th day of the month following the completed quarterly reporting period. The first quarterly reporting period shall end on March 31, 1975. Signed copies of these, and all other reports required herein, shall be submitted to the Regional Administrator at the following address:

United States Environmental Protection Agency
Region X
1200 Sixth Avenue
Seattle, Washington 98101

Attn: Water Compliance Evaluation Section M/S 521

LEAVENWORTH NATIONAL FISH HATCHERY
POLLUTION ABATEMENT FACILITIES
DISCHARGE MONITORING REPORT SUMMARY

Month	Total Discharge			Cleaning Effluent		
	Suspended Solids		Settleable Solids	Suspended Solids	Settleable Solids	
	Daily Average (lbs/day)	Daily Maximum (lbs.day)	Instantaneous Maximum* (mg/l)	Instantaneous Maximum* (mg/l)	Instantaneous Maximum (ml/l)	
July 1983	78			1.6	0.2	
August 1983	78			2.1	-	
September 1983	-			-	-	
October 1983	86			1.0	0.1	
November 1983	152			2.6	0.1	
December 1983	197			2.0	0.1	
January 1984	154			2.6	0.1	
February 1984	487			3.0	0.1	
March 1984	-			2.7	0.1	
April 1984	-			2.2	0.1	
May 1984	-			-	0.1	

*Standards are net over intake, value shown is gross for discharge point.

T indicates trace amounts measured.

Information taken from EPA Form 3320-1 as submitted in accordance with NPDES Permit No. WA-000190-2.

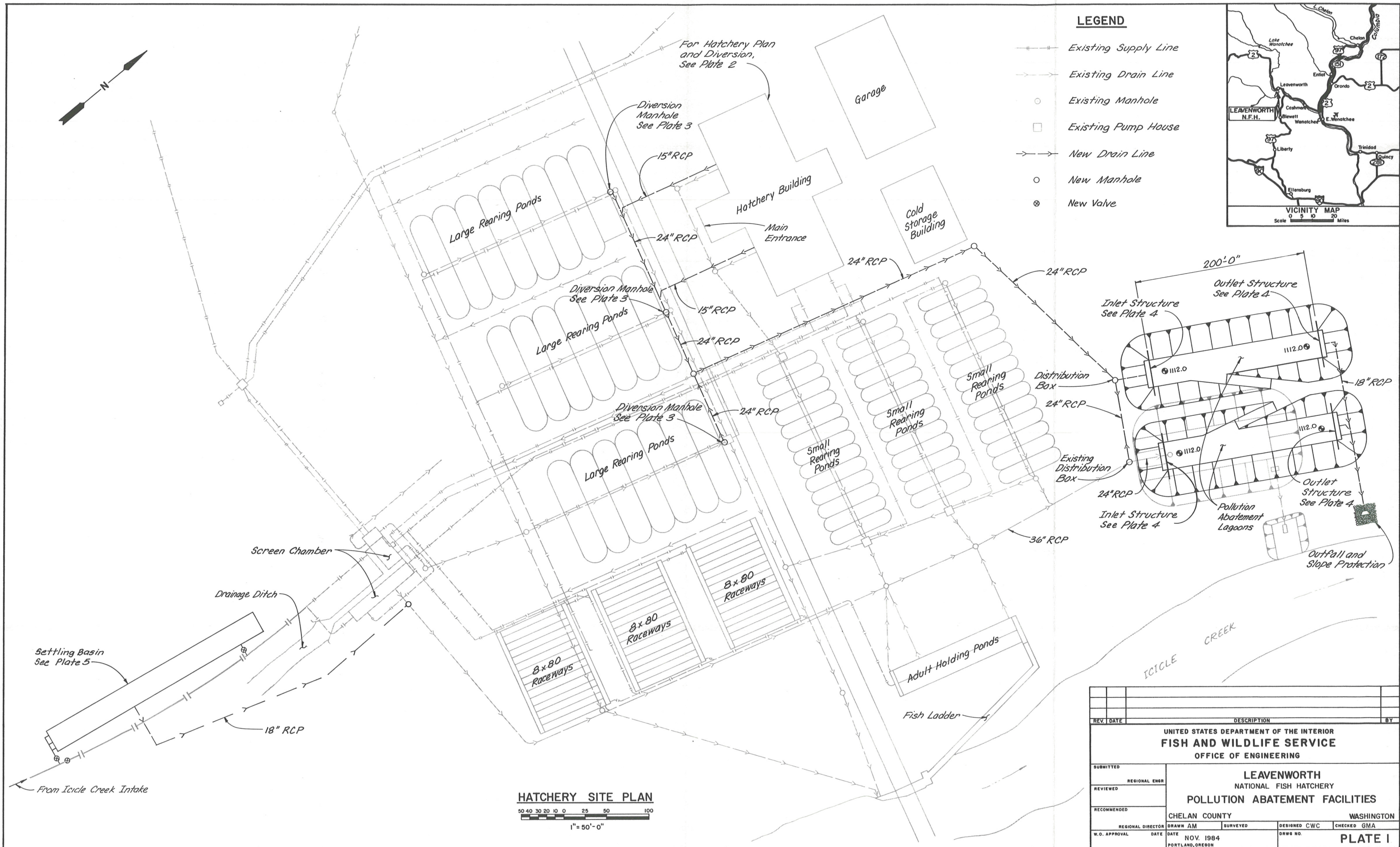
LEAVENWORTH NATIONAL FISH HATCHERY
POLLUTION ABATEMENT FACILITIES
DISCHARGE MONITORING REPORT SUMMARY

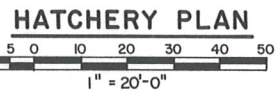
Month	Total Discharge			Cleaning Effluent	
	Suspended Solids		Settleable Solids	Suspended Solids	Settleable Solids
	Daily Average (lbs/day)	Daily Maximum (lbs.day)	Instantaneous Maximum* (mg/l)	Instantaneous Maximum* (mg/l)	Instantaneous Maximum (ml/l)
January 1982	434			0.8	0.04
February 1982	169			2.2	0.01
March 1982	45			2.6	0.01
April 1982	148			1.2	0.01
May 1982	44			1.2	0.2
June 1982	59			1.1	0.2
July 1982	34			3.4	0.1
August 1982	180			3.4	1.1
September 1982	157			6.0	1.0
October 1982	95			0.7	0.2
November 1982	73			-	0.1
December 1982	213			0.85	1.75
January 1983	150			2.0	0.2
February 1983	189			1.5	0.2
March 1983	287			0.7	0.2
April 1983	67			1.1	0.2
May 1983	315			1.2	0.2
June 1983	175			1.5	0.2

*Standards are net over intake, value shown in gross for discharge point.

T indicates trace amounts measured.

Information taken from EPA Form 3320-1 as submitted in accordance with NPDES Permit No. WA-000190-2.





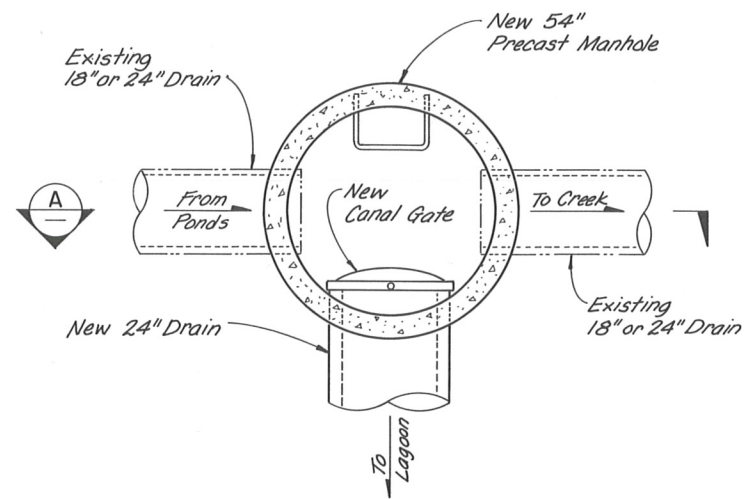
Note: Shown for initial trough diversion, intermediate trough diversions similar except as noted.

PLAN-TYPE 2 TROUGH DIVERSION

LEGEND

Indicates New Construction

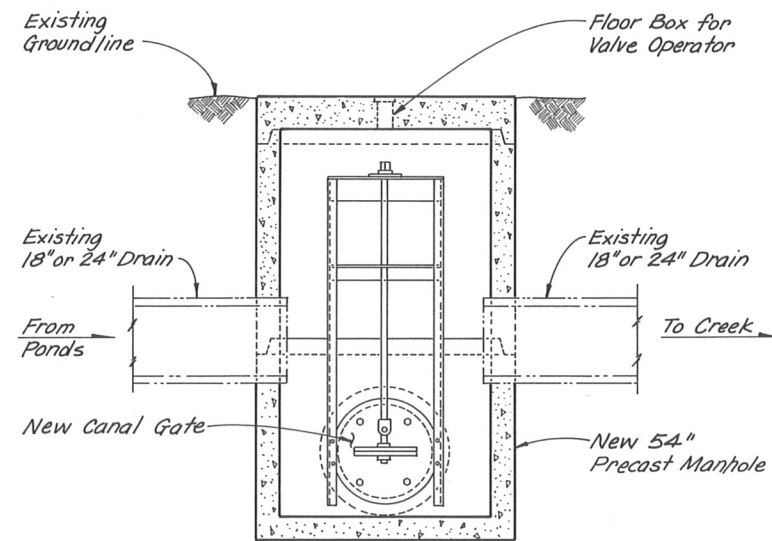
REVISION	STATUS	DATE	DESCRIPTION		BY
LEAVENWORTH NFH HATCHERY DIVERSION POLLUTION ABATEMENT					
DATE	DESIGNED CWC	DRAWN AM	CHECKED GMA	DRAWING NO.	
10-84				PLATE 2	



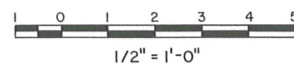
PLAN

DIVERSION MANHOLE

Note: Top of Manhole, 24" Manhole Cover, & Floor Box not shown.



SECTION A



REVISION	STATUS	DATE	DESCRIPTION	BY
LEAVENWORTH NFH				
DIVERSION DETAILS				
POLLUTION ABATEMENT				
DATE	DESIGNED	DRAWN	CHECKED	DRAWING NO.
10-84	CWC	AM	GMA	

PLATE 3

SHEET ____ OF ____

